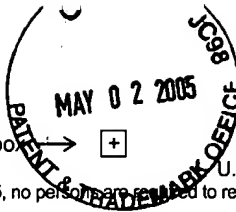


Please type a plus sign (+) inside this box



PTO/SB/21 (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it displays a valid OMB control number.

<b>TRANSMITTAL FORM</b> <i>(to be used for all correspondence after initial filing)</i>	<b>Application Number</b>	09/868,244	
	<b>Filing Date</b>	July 10, 2001	
	<b>First Named Inventor</b>	M. SIEVÄNEN et al.	
	<b>Group Art Unit</b>	3711	
	<b>Examiner Name</b>	W. Pierce	
<b>Total Number of Pages in This Submission</b>		<b>Attorney Docket Number</b>	43289-201088

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form  <input type="checkbox"/> Fee Attached  <input type="checkbox"/> Amendment / Response  <input type="checkbox"/> After Final  <input type="checkbox"/> Affidavits/declaration(s)  <input type="checkbox"/> Extension of Time Request  <input type="checkbox"/> Express Abandonment Request  <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> Certified Copy of Priority Document(s)  <input type="checkbox"/> Response to Missing Parts/ Incomplete Application  <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application)  <input type="checkbox"/> Drawing(s)  <input type="checkbox"/> Licensing-related Papers  <input type="checkbox"/> Petition  <input type="checkbox"/> Petition to Convert to a Provisional Application  <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address  <input type="checkbox"/> Terminal Disclaimer  <input type="checkbox"/> Request for Refund  <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group  <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences  <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)  <input type="checkbox"/> Proprietary Information  <input type="checkbox"/> Status Letter  <input type="checkbox"/> Other Enclosure(s) (please identify below):
<b>Remarks</b>		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT		
Firm or Individual name	Venable P.O. Box 34385 Washington, D.C. 20043-9998	*26694* 26694 PATENT & TRADEMARK OFFICE
Signature	Eric J. Franklin, Reg. No. 37,134	
Date	May 2, 2005	

CERTIFICATE OF MAILING			
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450b on this date: _____			
Typed or printed name			
Signature		Date	

**VENABLE**  
ATTORNEYS AT LAW

SEND TO: Commissioner for Patents, P. O. Box 1450, Alexandria, 22313-1450.

**BEST AVAILABLE COPY**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PTO**  
**Patent Fee Transmittal**  
**for FY 2005**  
Patent fees are subject to annual revision.  
**TOTAL AMOUNT OF PAYMENT (\$)** 250

**Complete if Known**

Application Number	09/868,244
Filing Date	July 10, 2001
First Named Inventor	SIEVÄNEN et al.
Examiner Name	W. Pierce
Group / Art Unit	3711
Attorney Docket No.	43289-201088

**METHOD OF PAYMENT (check one)**

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number: 22-0261

Deposit Account Name: VENABLE LLP

☒ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☒ Applicant claims small entity status. See 37 CFR 1.27

2. ☐ Payment Enclosed:

☐ Check ☐ Credit card ☐ Money Order ☐ Other

**FEE CALCULATION**

1. BASIC FILING FEE	
Large Fee Code	Small Fee Code
1001	2001
1002	2002
1003	2003
1004	2004
1005	2005

**SUBTOTAL (1)** (\$ 0)

**2. EXTRA CLAIM FEES**

Total Claims:  - \*\* =  X  =

Independent Claims:  - \*\* =  X  =

Multiple Dependent:  X  =

Large Fee Code	Small Fee Code
1202	2202
1201	2201
1203	2204
1204	2204
1205	2205

**SUBTOTAL (2)** (\$ 0)

\*\*or number previously paid, if greater; For Reissues, see above

**3. ADDITIONAL FEES**

Fee Code	Large Entity Fee (\$)	Small Entity Fee Code	Small Entity Fee (\$)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2215	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2080	2255	1040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	250
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,400	2453	700	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	25403	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1808	130	1808	130	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
Other fee (specify) _____					
*Reduced by Basic Filing Fee Paid					
<b>SUBTOTAL (3)</b> (\$ 250)					

**SUBMITTED BY**

Name (Print/Type)	Eric J. Franklin	Registration No. Attorney/Agent	37,134	Telephone	(202) 344-4000
Signature				Date	May 2, 2005



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Sievänen et al.

Application No.: 09/868,244

Filed: July 10, 2001

:  
:  
:  
:  
:  
:

Attorney Docket: 43289-201088

Art Unit: 3711

Examiner: W. Pierce

Title: CONSTRUCTION ELEMENT FOR A BOWLING LANE AND A BOWLING LANE

BRIEF ON APPEAL

Mail Stop Appeal Brief  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This Brief is pursuant to the Notice of Appeal filed March 1, 2005.

05/03/2005 JBALINAN 00000070 220261 09868244

01 FC:2402 250.00 DA

### **Real Party In Interest**

The real party in interest in this appeal is the assignee, SYSTEM-300 GROUP OY, Osuusmyllynkatu 5, FIN-33700, Tampere, Finland, by virtue of an assignment from the inventors to SYSTEM-300 GROUP OY, which was recorded in the U.S. Patent and Trademark Office on July 16, 2001, at reel 012003, frame 0162.

### **Related Appeals and Interferences**

Applicants are unaware of any related appeals or interferences which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

### **Status of Claims**

The application as filed included claims 1-10. In the response submitted June 5, 2002, to the office action issued March 7, 2002, Applicant cancelled claims 1-10 and presented claims 11-27. In the response submitted September 19, 2002, to the office action issued June 19, 2002, Applicant amended claims 11 and 26 and cancelled claim 23. On October 18, 2002, Applicant submitted a Request For Continued Examination. In the response submitted November 18, 2003, to the office action issued June 18, 2003, Applicant amended claims 12-15, 17-19, 21, 22, 24-26, and presented claim 28. Applicants submitted a second Request For Continued Examination on December 18, 2003. In the response submitted August 17, 2004, to the office action issued May

17, 2004, Applicants amended claims 26 and 28. In the final office action dated December 16, 2004, claims 12-22 and 24-28 were finally rejected. Applicants are appealing the rejection of all finally rejected claims.

### **Status of Amendments**

Applicant has not filed any amendments subsequent to the final rejection.

### **Summary of Claimed Subject Matter**

The present invention relates to bowling lanes and in particular to improved bowling lanes made up of a plurality of lightweight sections. Traditionally, bowling lanes are composed of a substructure and boards attached thereto or of wood strips attached to each other. The substructure is usually a trussed construction made of wood beams. Typically, there are several boards placed on top of each other so that the required strength properties are attained. If the surface material of the lane is synthetic material instead of wood, a laminate layer is typically attached on the outer surface of the topmost board.

A bowling lane is composed of an approach, a ball track and a pin deck. Different parts of the bowling lane require different qualities, which have to be taken into account when the lane is designed. By the approach, the lane has to endure, for example, the weight of the bowler, and as far as the ball track and the pin deck are concerned, impact resistance and the friction on the surface of the lane are important features.

Problems associated with known construction elements for bowling lanes include complexity of installation, heavy elements, relatively high price of the elements as well as poor sales value due to the complexity of the installation/disassembly. The construction of the bowling lanes is not optimized either, such that the construction is appropriate for particular regions of the lanes. Also, traditional lanes, which typically include mostly wood or wood based elements easily react to changes in climate conditions. On the other hand, the different parts of the lane require different qualities. Thus, a construction that is uniform over its entire length is not the best. The specification describes the prior art and its shortcomings at page 2, line 33, through page 3, line 5.

The invention represents a completely new way of thinking in the field of bowling lanes, providing a particularly simple solution that is especially effective at addressing these problems. For example, the present invention provides light and inexpensive construction elements that can be easily assembled, disassembled and moved about. This makes it easy to construct a temporary lane. Additionally, the easily assembly and disassembly gives the present invention a better resale value since it is made to be taken apart and moved.

The construction element is capable of withstanding the forces that a bowling lane typically encounters. The present invention also provides a very stable bowling lane construction.

The modular nature of the bowling lane and construction elements makes it possible to

optimize the lane characteristics for each portion of a lane. The particular construction of the lane elements makes them better able to endure changes in temperature and humidity.

Construction elements according to the present invention may be made with a bowling surface on both sides, making it possible to turn the construction element with either side facing up so that if one side is worn, the element may be flipped over and other side easily utilized.

As recited in independent claim 26, the present invention includes a sectional bowling lane. (*See* page 3, lines 18-22; and page 5, lines 34-36.) The bowling lane includes a substructure comprising beams. (*See* page 5, lines 31-34; and Fig. 3.) A plurality of construction elements is arranged on top of the substructure. (*See* page 5, lines 34-36.) Each construction element includes at least one supporting structure layer including a cellular board (page 4, lines 16-17), an impact stress enduring board layer attached to opposite sides of the supporting structure layer (page 4, lines 12-17), and at least one impact-resistant laminate layer (page 4, lines 19-21) attached to the board layer on at least one side of the supporting structure layer (page 3, lines 20-22; page 5, lines 20-22; and Fig. 1). The construction elements are operatively connected to each other. (*See* page 5, lines 34-36.)

The invention as recited in independent 28 includes a construction element for a sectional bowling lane. (*See* page 3, lines 7-9) The construction element includes at least one supporting structure layer including a cellular board. (*See* page 4, lines 16-17.) An impact stress enduring board layer is attached to opposite sides of the supporting structure layer. (*See* page 4, lines 12-17.) At least one impact resistant laminate layer (page 4, lines 19-21) is attached to the board layer on at least one side of the supporting structure layer (page 3, lines 20-22; page 5, lines 20-

22; and Fig. 1). The construction element is configured to be operatively connectable to at least one other construction element. (See page 5, lines 34-36.)

### **Grounds Of Rejection To Be Reviewed On Appeal**

I. The Examiner rejected claims 12-22 and 24-28 35 U.S.C. § 103(a) over Brunst in view of Beamish and further in view of Honeycomb Product and Paneltec and further in view of U.S. patent 5,349,893 to Dunn and U.S. patent 5,106,668 to Turner et al.

### **Argument**

**I. Claims 12-22 and 24-28 are patentable under 35 U.S. C. § 103(a) over Brunst in view of Beamish and further in view of Honeycomb Product and Paneltec and further in view of U.S. patent 5,349,893 to Dunn and U.S. patent 5,106,668 to Turner et al.**

Brunst does not suggest the present invention as recited in independent claims 26 and 28 since, among other things, Brunst does not suggest a bowling lane construction element describes the requirements of a bowling lane including straightness and impact resistance. While Brunst et al. may suggest a panel member for a bowling lane. The panel member is made of wooden strips attached together. In other words, the wooden core is solid. A high pressure laminate member is adhered to each face of the wooden panel. To address issues of impact resistance, Brunst suggests sealing an entire wooden element, made flat by sanding, inside a protective durable laminate. Once the lane element reaches the end of its life span, Brunst



suggests changing the element. Brunst may suggest a panel type structure but not the construction element according to the present invention as recited in claims 26 and 28.

Additionally, Brunst et al. does not suggest the present invention as recited in independent claims 26 and 28 since, among other things, Brunst et al. does not suggest a board layer between a laminate layer and a supporting structure layer. The present invention as recited in independent claim 26 and 28 includes a laminate layer, a board layer and a supporting structure layer. On the other hand, Brunst et al. only suggests a composite panel that includes a laminate layer 31 and a core layer 20. The core is formed of wood strips that are attached to each other. Each face of the core is covered with a high pressure laminate.

Brunst et al. also does not suggest a cellular core layer. However, even if the board core suggested by Brunst et al. were replaced with a cellular core layer, the combined structure would still lack the board layer of the present invention. The board layer in the construction element is an important part because the other layers are less able or incapable of receiving the impacts that are common in bowling lanes.

The Examiner has previously asserted that it would be obvious to replace the core suggested by Brunst et al. with a honeycomb structure. However, the Examiner has not adequately explained how this substitution would be obvious. If one assumes that the wooden core suggested by Brunst et al. is replaced by the honeycomb structure, the resulting construction would include uneven laminate faces echoing the surface pattern of the honeycomb layer. As a result, the resulting construction would neither bear stresses caused by falling balls and nor

would it fulfill the straightness requirements. This illustrates why the combination is not obvious.

The solution suggested by Brunst et al. has not been commercially successful in the more than twenty years since its issue. This is demonstrated by the fact that it is still common practice to sand lanes regularly to maintain their flatness.

Combining the structure suggested by Brunst et al. with the structure suggested by Beamish does not suggest the present invention as recited in claims 26 and 28 since, among other things, Beamish does not overcome the deficiencies of Brunst et al. For example, Beamish does not suggest a bowling lane construction element that includes the layers recited claims 26 and 28. Beamish suggests a method for producing a composite structural member free from distortion or buckling. However, as described at col. 2, lines 1-68 and col. 3, lines 1-4, Beamish suggests that is it not possible to press the face plates and the core together and still obtain a structure free from distortion or buckling.

The face plates 12 and 13 suggested by Beamish do not suggest the board layer of the present invention. Such faceplates are light facings on each side of the honeycomb core and do not contribute to the physical characteristics of the core. As can be seen in the drawing figures of Beamish, the face plates are sufficiently flexible to be processed as continuous webs.

Additionally, Beamish suggests that that the parts to be attached shall be heated beforehand to obtain structural members free from distortion or buckling. *See* col. 3, lines 1-70,

col. 4, lines 1-2 and claim 1. Thus, Beamish teaches away from the present invention because the method that is capable of producing distortion free structural members cannot be applied on construction elements of a bowling lane due to materials used in bowling lanes. One of ordinary skill in the art would not apply the method suggested by Beamish on a bowling alley construction element since the requirement of heating expandable material, such as metal, in the board layer is not suitable for bowling lanes as a result of a lack of impact resistance and noise, among other things.

Furthermore, the method suggested by Beamish would create huge problems in attaching the laminate layer. Significantly, the construction element would not fulfill the requirements of a bowling lane. As a result, one of ordinary skill in the art would not utilize the method of Beamish since it would not work and would see that laminating or pressing the parts together would not be worth trying.

The Honeycomb Products, Paneltec and Bellcomb Technologies references are not valid prior due to their dates, which are all after the priority date for the present application. With the final office action dated December 16, 2004, the Examiner provided some output from the internet, attached as part I of the Evidence Appendix. The Examiner asserts suggest that the sites have effective dates as references that are before the priority date of the present invention. This output actually establishes that most if not all of the material contained in the sites was posted after the December 18, 1998 priority date of the present application. Where the output indicates that any information was posted prior to the priority date, it is only a small portion of the entire contents of the site and there is not indication as to the contents of any information that might

have been posted prior to the priority date of the present application.

For example, the "Waybackmachine" output relating to the Paneltec web site only indicates that 2 pages, having dates of December 2, 1998 and December 12, 1998 were posted prior to the priority date. The other 65 pages listed all were posted after the priority date, and in some cases well after the priority date. The output provided by the Examiner does not indicate what the contents of the site was before or after the update. In fact, the updating of the pages could have included posting information that the Examiner relies on for the first time. The additional output regarding the Paneltec site indicates that some portion of the site was modified October 23, 1998. This not only conflicts with the "Waybackmachine" output, but also again does not indicate what portion of the site might have been modified on this contradictory date.

The "Waybackmachine" output relating to the Honeycomb Products web site actually indicates that no portion of the site was updated before October 22, 1999. Also, the additional materials relating to the Honeycomb Products include url's for logos, images and other gif and jpg files. Furthermore, the date information that appears at the end of this page indicates dates of modification of December 24, 1998, a date after the priority date for the present application. Once again, there is no indication of the contents of the Honeycomb Products web site before or after modification and therefore, whether the site contained any information that might have been useful as a reference in this case.

The "Waybackmachine" output relating to the Bellcomb web site actually indicates that one page of the site was updated December 12, 1998. Also, the additional materials relating to

the Bellcomb include url's for logos, images and other gif and jpg files. Once again, there is no indication of the contents of the Bellcomb web site before or after modification and therefore, whether the site contained any information that might have been useful as a reference in this case.

Significantly, none of the output provided by the Examiner to assert that the websites are valid references includes any indication of contents of the earlier posted information. As a result, the Honeycomb Products, Paneltec and Bellcomb Technologies web sites are not valid references against the present invention. The Examiner asserts that these sites shows a fraction of the ordinary level of skill in the art of honeycomb" at the time of the invention of the present invention. As stated above, none of these sites has a valid date as a reference. As a result, none of these web sites provides any evidence of the level of one skilled in the art at the time the present invention was made-the relevant time in any rejection over the art. Consequently, the rejection based upon a combination including these references is invalid.

Contrary to the Examiner's assertion, Applicants' arguments concerning the dates of the references are not an admission of any earlier date for the references. Nor have Applicants acquiesced to their citation by simultaneously arguing their invalid dates and the contents of their disclosure. Applicants did not admit that the web site appeared in 1997. By stating that the portion of the Honeycomb Products website cited by the Examiner was posted on December 24, 1998, Applicants in no way admitted that the web site appeared in 1997. It is a logical error on to infer such. The Examiner has not provided valid dates for the cited references.

The invalid dates of the references do not make them suitable to show the state of the art at the time the present invention was made. There is no evidence that the versions of the web sites supplied by correspond to the contents of the web sites at a time relevant for them to serve as valid references. There is no way to determine from these references the level of the skill of the art at the time the present invention.

Even if the Honeycomb Products, Paneltec and Bellcomb Technologies web sites were validly available as references in this application, they would not suggest the present invention. Simply showing a honeycomb construction does not suggest the construction element or bowling lane according to the present invention. For example, the Honeycomb products reference only suggests cellulose-based products, such as paper or cardboard. Such products are not suitable for use in bowling lanes due to their inability to withstand the loads that a bowling lane is subject to. Also, if such products become wetted or dirty, the effects are not reversible. The nature of the loads that the Honeycomb products are capable of withstanding are discussed in the reference. These examples are much less than the loads that a bowling lane is subjected to. As a result, the combination of Honeycomb Products, Paneltec and Bellcomb Technologies with Brunst et al., Beamish, Dunn and Turner et al. does not suggest the present invention.

Contrary to the Examiner's assertion, the present invention is not merely the use of honeycomb panels in a bowling alley. Clearly as recited in the claim, the present invention is not just honeycomb panels intended for use in a bowling lane. The present invention is a multilayer structure that includes as one of the layers a honeycomb panel. However, the present invention also includes other layers.

Including known materials does not make an invention anticipated or obvious. Certainly mechanical inventions are typically made of known materials and utilize known principles. However, the way that these known materials are put together is new. This is the case with the present invention.

In the rejection, the Examiner states that using honeycomb panels "would have been an obvious matter of design choice". However, the Examiner does not give any reasoning why one would make such a substitution. It is known buckling and warpage effects can occur in connection with honeycomb structures. These buckling and warpage effects are highly undesirable features in the construction element for a bowling lane. In view of the above, one of ordinary skill in the art would not consider utilizing a honeycomb structure in a bowling lane construction element.

While honeycomb structures are known, their vulnerability to impact is also known. This vulnerability was described in *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, held at Virginia Tech in June 1999, as well as on the website of Finite Element Analysis, Ltd., which was last modified on March 17, 2003. The abstract attached hereto as Exhibit II of the attached Evidence Appendix, was submitted in conjunction with the *Symposium on Recent Developments in the Study of Impacts on Composite Materials* is attached hereto. This abstract entitled *The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body* describes that composite materials, such as Nomex honeycomb composite, have relatively low resistance to impact damage. The website of Finite Element

Analysis, Ltd., under the tradename LUSAS, goes further, stating that honeycomb sandwich panels “are generally poor at resisting impact damage.”

The attached rules of the American Bowling Congress governing bowling lanes demonstrate the stringent requirements for bowling lanes, such as a crosswise tilt of less than 0.004 inch over the width of a lane. One of ordinary skill in the art might be aware of cellular structures used in other fields. However, as is apparent from the reference materials attached hereto, one of ordinary skill in the art would also know of the susceptibility of such structures to damage from impacts. As described in *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, at first, dents would appear and then the cellular structure would start to lose its strength.

It is clear that the low impact resistance of honeycomb panels is known and was known at the time the present invention was made. These facts provide sufficient evidence that it would not have been obvious at the time the present invention was made to employ cellular structures in a bowling lane. It follows that it would not be obvious to combine the references in the manner asserted the by Examiner.

Applicants have never claimed to be the inventors of honeycomb panels or any of the other layers that make up the construction element of the present invention. Nor are Applicants only claiming honeycomb panels. However, Applicants have invented a new bowling alley construction element that is inexpensive, light weight, can be easily assembled and disassembled,



and endures humidity and temperature changes better than known bowling alley construction elements.

The court in *In re Burke Inc.*, 22 U.S.P.Q.2d 1368 (C.D. CA 1992), found that a combination of elements is patentable. Along these lines, the court found that a claim for three-wheeled "personal mobility vehicle" is not obvious, even though individual elements of claim were known in prior art, since claim discloses flexibility in use of vehicle both indoors and outdoors at particular sites, and convenient separation of vehicle into components small and light enough for easy transportation, as new or different function flowing from claimed combination.

Similarly, in *Ex parte Hiyamizu*, 10 U.S.P.Q.2d 1393 (Bd. of App. 1988), the Board of Appeals found that, "It is to be noted, however, that citing references which merely indicate that isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that the combination of claimed elements would have been obvious." In this case, Applicants are claiming a unique combination of layers that is not obvious based upon the cited references.

Additionally, the present invention is directed to a bowling alley construction element. The recitation in the preamble of a bowling alley construction element breathes life and meaning into the claim. In other words, the present invention is not directed to panels for use in any application. Rather, the present invention includes panels that fulfill all of the requirements that a bowling alley must fulfill. These requirements include the ability to withstand the impact of a

bowling ball. In fact, a bowling lane forms an essential part of a game that has strict rules governing all aspects of the game.

The construction element of the bowling lane must fulfill strict straightness requirements laid for the bowling lanes as exemplified by the page of the regulations of the American Bowling Congress attached hereto as Exhibit III of the Evidence Appendix. These requirements address, among other things, the need for similar conditions to prevail for each player. If such conditions cannot be guaranteed, it is not possible to hold for example bowling competitions. The bowling lane of the invention is a lane having a very stable construction.

A preamble that recites intended use may act to define an invention. As stated by the court in *Corning Glass Works v. Sumitomo Electric U.S.A. Inc.*, 9 U.S.P.Q.2d (Fed. Cir. 1962), a preamble may "not merely state a purpose or intended use for the claimed structure." In *Corning Glass Works*, "the inventors were working on the particular problem of an effective optical communication system not on general improvements in conventional optical fibers."

In finding that the preamble added meaning to the claim, the court stated that reading "the claim in light of the specification indiscriminately to cover all types of optical fibers would be divorced from reality." Furthermore, the court stated that, "The invention is restricted to those fibers that work as waveguides as defined in the specification." The court concluded "that the claim preamble in this instance does not merely state a purpose or intended use for the claimed structure," and that the preamble gave "life and meaning" to the claim and provided "further positive limitations to the invention claimed."

Bowling lanes have certain requirements. The present invention provides a structure that satisfies these requirements; the claims recite this. As a result, the present invention is not claiming just a composite construction element, only those that include the layers recited in the claims and, further, that satisfy the requirements of bowling lanes.

In addition to the honeycomb layer, the present invention includes other layers. The present invention is not simply a floor structure. It must satisfy the requirements of a bowling lane. None of the cited references suggest a bowling lane structure that includes the combination of layers and a combination of layers that meets the recited requirement of being a bowling lane.

Even if they were valid references, neither Honeycomb Products nor Paneltec suggests a structure that is a bowling lane construction element. For example, Honeycomb Products suggests a honeycomb structure made of kraft paper, which is certainly unsuitable for use in a bowling lane construction element at least in part due to its inability to withstand the loads that a bowling lane is subject to. Also, if such structure become wetted or dirty, the effects would not be reversible. The nature of the loads that the Honeycomb Products are capable of withstanding are discussed in the reference. These examples are much less than the loads to which a bowling lane is subjected.

The Examiner also cites the Dunn and Turner patents as suggesting product that include honeycomb structures and are impact resistant. These products teach away from a bowling lane element that includes a honeycomb structure. Along these lines, Dunn suggests impact

absorbing armor that deforms when absorbing kinetic energy. Dunn suggests a structure that has stopping power. *See* col. 6, lines 46-50. Dunn goes on to suggest at col. 6, line 53, that the structure is to dampen force of impact. At col. 5, lines 35-36 and 54-56, Dunn suggests utilizing honeycomb structures in particular and materials to provide an energy absorbing structure. On the other hand, a bowling lane such as the present invention should not deform upon impact of the bowling ball. The bowling ball should bounce off of the lane with minimal energy absorption or removal of kinetic energy. If the lane deformed upon impact of the bowling ball, the result would be a dimpled lane surface. In view of the above, the teaching of Dunn is irrelevant and leads one away from the idea of utilizing honeycomb structures in a bowling lane.

On the other hand, Turner suggests an aircraft floor structure. Such a structure does not undergo the stresses that a bowling lane undergo and does not need to maintain the tolerances of the bowling lane surface. There are no board layers or laminate layers attached to the honeycomb, only another honeycomb structure and skin. The skin layer is a part of the honeycomb, not a layer attached to the honeycomb structure. This is supported by the text of the specification of Turner, which states at col. 1, lines 14-16, which states that "[a] typical honeycomb structure includes a hexagonally cellular core with a skin layer covering at least one face of the core." Therefore, the skin is not another layer attached to the honeycomb, but rather is a part of the honeycomb. Turner does not suggest a structure that can withstand repeated impacts. Along these lines, col. 1, lines 62-66, state that the second honeycomb is "not, by itself, able to withstand the impact or bending stresses which can be supported by the laminated structure."

The Examiner has stated that "using stronger and thicker materials, that increases the weight of the panel, also increases its resistance to impact." As a result, the Examiner then concludes that it is obvious to use honeycomb panels. However, one of the objects of the present invention is to provide a lightweight panel. Therefore, the Examiner's statement does not lead one of ordinary skill in the art to the present invention, but rather leads away from the present invention.

There is nothing in any of the references that makes the bowling lane including composite panels obvious. Additionally, the combination of references is invalid since many of the references relied upon are not valid prior art.

Applicants have not inferred "that only low impact resistant honeycomb panels existed" at the time of the making of the present invention. The Examiner has inferred that Applicants have made such an assertion. Applicants' acknowledgement that such panels existed is not a statement that other such panels did not exist. It is misleading and erroneous at best for the Examiner to assert that Applicants made such a statement.

Applicants also stand by the statement that, "Simple face plates applied on honeycomb panels are not sufficient to prevent damage." There is nothing false about this statement. The statements concerning the Honeycomb Products, Paneltec and Bellcomb Technologies web sites websites are irrelevant since these are not valid prior art.

It is unexpected to include a honeycomb panel as one element in a construction element

that forms part of a bowling lane. The strength of a material does not mean that it is suitable in any application. For example, carbon fiber is one of the strongest materials known. However, once its structure is broken or fractured, it is very weak. As a result, carbon fiber structures have little or no resistance to repeated impacts. So citing a list of strong materials does not make the construction element of the present invention obvious.

At the time the present invention was made, no commercially available modular panel was suitable for a bowling lane. Seizing upon a new way of thinking, the Applicants developed a new construction element from materials known to have poor impact resistance. This way of thinking and the resulting structure are contrary to the prior art.

The present invention also provides a lightweight element, weighing just 100 kg as compared to 195 kg for known structures, as described at page 6, lines 1-10 of the specification. As a result, the laminate and board layers of the present invention need to be considerably thinner in the present invention, which is contrary to the knowledge of those skilled in the art. One of ordinary skill in the art would know that two board layers that are positioned loosely on top of each other and have a laminate layer on the surface of the uppermost board are sufficient for attaining a reasonable lane construction, but that repairing is required from time to time. Addition of a cellular layer, which has poor impact resistance and at the same time making the board layers and laminate layer thinner and joining all of those layers together to prevent resurfacing is illogical based on the prior art.

However, unexpectedly, the present invention has proved to maintain its straightness.

Also, the present invention has proven to be highly resistant to dents because the board layer, which is attached to the supporting structure layer, spreads the impact force into the plane of the board layers. Furthermore, the present invention makes it possible to optimize the impact resistance, the thickness of the various layers and the weight of the construction element in different sections of a bowling lane.

Everything, even compositions of matter are made of combinations of elements. It is the combination that the invention lies. The looking at elements in isolation does not make the combination or application of the combination obvious. The present invention is not merely a combination of boards and honeycomb panel. The present invention is a lightweight, sectional bowling alley element. When compared to the prior art of bowling alley construction, the present invention represents a vast improvement. No scaffolding, staging, honeycomb panel needs to endure the sort of repeated impacts of 8, 10, 12, 14 pound bowling balls and still maintain the sort of tolerance that a bowling alley must maintain. Even if a honeycomb panel is known that is strong or lightweight, that does not make it suitable alone as a bowling alley element. The Examiner is arguing against each portion of the construction individually.

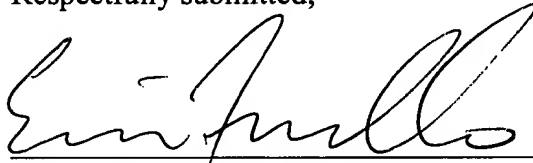
In view of the above, the references relied upon the final rejection, whether considered alone or in combination, do not suggest patentable features of the present invention. Therefore, the references relied upon the final rejection, whether considered alone or in combination, do not make the present invention obvious. Accordingly, Applicants submits that the present invention is patentable over the cited references and respectfully request reversal of the rejections and allowance of the claims.

The undersigned authorizes the Commissioner to charge insufficient fees and credit overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully submitted,

Date:

5/2/05

A handwritten signature in black ink, appearing to read "Eric J. Franklin", written over a horizontal line.

Eric J. Franklin, Reg. No. 37,134  
Attorney for Applicant  
Venable LLP  
575 7<sup>th</sup> Street, NW  
Washington, DC 20004  
Telephone: 202-344-4936  
Facsimile: 202-344-8000



## **Claims Appendix**

### **Claims On Appeal**

1-11 (canceled)

12. (previously amended) The construction element according to claim 28, wherein the supporting structure layer comprises a board-like material comprising a wall that separates cells attached to each other wall-to-wall.

13. (previously amended) The construction element according to claim 28, wherein the cells have a regular hexagonal cross-section.

14. (previously amended) The construction element according to claim 28, wherein the supporting structure layer comprises aluminum.

15. (previously amended) The construction element according to claim 28, further comprising a cell filling material.

16. (previously presented) The construction element according to claim 15, wherein the cell filling material comprises polyurethane.

17. (previously amended) The construction element according to claim 28, wherein the

board layer comprises a wood-based board.

18. (previously amended) The construction element according to claim 28, wherein the laminate layer comprises at least one resin impregnated paper layer.

19. (previously amended) The construction element according to claim 28, wherein the laminate layer, the board layer and the supporting structure layer are fixed together permanently.

20. (previously presented) The construction element according to claim 19, wherein the laminate layer, the board layer and the supporting structure layer are fixed together with adhesive.

21. (previously amended) The construction element according to claim 28, wherein the construction element is constructed to be mirror symmetrical in such a way that on both sides of the supporting structure layers there is a board layer, and on an outer surface of both board layers there is a laminate layer.

22. (previously amended) The construction element according to claim 28, wherein the board layer is arranged between the laminate layer and the supporting structure.

23. (canceled)

24. (previously amended) The construction element according to claim 28, wherein the

construction element includes a plurality of laminate layers, a plurality of board layers, and a plurality of supporting structure layers.

25. (previously amended) The construction element according to claim 28, wherein the construction element includes a plurality of laminate layers and a plurality of board layers.

26. (previously amended) A sectional bowling lane, comprising:  
a substructure comprising beams; and  
a plurality of construction elements arranged on top of the substructure, each construction element comprising at least one supporting structure layer comprising a cellular board, an impact stress enduring board layer attached to opposite sides of the supporting structure layer, and at least one impact-resistant laminate layer attached to the board layer on at least one side of the supporting structure layer,

wherein the construction elements are operatively connected to each other.

27. (previously presented) The bowling lane according to claim 26, wherein the layers of the construction elements of the bowling lane have a different thickness in different sections of the bowling lane such that an overall thickness of the construction elements remains constant on the entire lane.

28. (previously amended) A construction element for a sectional bowling lane, the construction element comprising:

at least one supporting structure layer comprising a cellular board;

-  
-  
-  
an impact stress enduring board layer attached to opposite sides of the supporting structure layer; and

at least one impact resistant laminate layer attached to the board layer on at least one side of the supporting structure layer;

wherein the construction element is configured to be operatively connectable to at least one other construction element.

## **Evidence Appendix**

I. Website date evidence attached to final office action dated December 16, 2004.

## Bellcomb Technologies designer and manufacturer of lightweight structural panel systems has the following structure:

- <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/>
  - Background Image: <http://www.bellcomb.com/bkgd.jpg>
  - Image: <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/logo.jpg>
  - Image: <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/hexbuttn.jpg>
  - Image: <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/panel.jpg>
  - Image: <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/hexline.jpg>

**Location:** <http://web.archive.org/web/19981212023140/http://www.bellcomb.com/>

**File MIME Type:** text/html

**Source:** Currently in disk cache

**Local cache file:** MUKGG9QT

**Last Modified:** Tuesday, October 20, 1998 3:35:01 PM Local time

**Last Modified:** Tuesday, October 20, 1998 7:35:01 PM GMT

**Content Length:** 4839

**Expires:** No date given

**Charset:** iso-8859-1

**Security:** This is an insecure document that is not encrypted and offers no security protection.

INTERNET ARCHIVE

WayBackMachine

Enter Web Address: 

All

Adv. Search C...

Searched for <http://www.bellcomb.com>

44 Results

Note some duplicates are not shown. [See all.](#)

\* denotes when site was updated.

Search Results for Jan 01, 1996 - Dec 13, 2004

1996	1997	1998	1999	2000	2001	2002	2003	2004
0 pages	0 pages	1 pages	3 pages	3 pages	3 pages	3 pages	11 pages	1 pages
		Dec 12, 1998 *	Jan 25, 1999 Jan 28, 1999 Apr 24, 1999 Apr 27, 1999 Oct 13, 1999 *	Mar 03, 2000 May 11, 2000 Jun 06, 2000 Aug 15, 2000 Oct 17, 2000 Oct 18, 2000 Oct 21, 2000 *	Feb 03, 2001 Apr 01, 2001 *	Jun 03, 2002 Aug 06, 2002 Sep 26, 2002 Nov 21, 2002 Nov 25, 2002 Nov 27, 2002	Jan 28, 2003 Jan 30, 2003 Feb 19, 2003 Feb 20, 2003 Mar 20, 2003 Mar 31, 2003 Apr 09, 2003 May 01, 2003 May 22, 2003 Jun 03, 2003 Jun 22, 2003 Jun 23, 2003 Aug 09, 2003 Sep 30, 2003 Oct 17, 2003 Nov 26, 2003 Dec 11, 2003 Dec 22, 2003 Dec 26, 2003	Feb 02, 2004 Feb 09, 2004

[Home](#) | [Help](#)[Copyright © 2001, Internet Archive](#) | [Terms of Use](#) | [Privacy Policy](#)



# Honeycomb Products Corporation has the following structure:

- <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/>

Background Image: <http://www.honeycombproducts.com/back.jpg>

- Image: <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/logo1.gif>
- Image: <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/logo2.gif>
- Image: <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/corrsm1.gif>
- Image: <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/comb.jpg>
- Image: <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/trailer.jpg>

**Location:** <http://web.archive.org/web/19991022230218/http://www.honeycombproducts.com/>

**File MIME Type:** text/html

**Source:** Currently in disk cache

**Local cache file:** MV6CK6L2

**Last Modified:** Thursday, December 24, 1998 10:00:56 AM Local time

**Last Modified:** Thursday, December 24, 1998 3:00:56 PM GMT

**Content Length:** 4930

**Expires:** No date given

**Charset:** Unknown

**Security:** This is an insecure document that is not encrypted and offers no security protection.

http://web.archive.org/web/\*http://www.honeycombproducts.com

INTERNET ARCHIVE  
Wayback Machine

Enter Web Address: 

All

Admin Search

Searched for <http://www.honeycombproducts.com>

46 Results

Note some duplicates are not shown. [See all.](#)  
\* denotes when site was updated.

Search Results for Jan 02, 1996 - Dec 26, 2004								
1996	1997	1998	1999	2000	2001	2002	2003	2004
0 pages	0 pages	0 pages	2 pages	3 pages	3 pages	10 pages	10 pages	2 pages
			<a href="#">Oct 22, 1999</a> *	<a href="#">Oct 16, 2000</a> *	<a href="#">Feb 02, 2001</a>	<a href="#">Jan 21, 2002</a>	<a href="#">Jan 28, 2003</a>	<a href="#">Jan 29, 2004</a>
			<a href="#">Nov 28, 1999</a> *	<a href="#">Oct 18, 2000</a>	<a href="#">Feb 03, 2001</a>	<a href="#">May 27, 2002</a>	<a href="#">Feb 19, 2003</a>	<a href="#">Feb 08, 2004</a>
					<a href="#">Mar 02, 2001</a>	<a href="#">May 31, 2002</a>	<a href="#">Mar 31, 2003</a> *	
					<a href="#">Apr 01, 2001</a>	<a href="#">Jun 05, 2002</a> *	<a href="#">Apr 02, 2003</a> *	
					<a href="#">Apr 02, 2001</a>	<a href="#">Aug 05, 2002</a> *	<a href="#">Apr 22, 2003</a>	
					<a href="#">Apr 05, 2001</a>	<a href="#">Sep 24, 2002</a> *	<a href="#">Apr 23, 2003</a> *	
					<a href="#">Sep 22, 2001</a>	<a href="#">Sep 27, 2002</a> *	<a href="#">May 27, 2003</a> *	
					<a href="#">Nov 29, 2001</a>	<a href="#">Sep 29, 2002</a>	<a href="#">Jun 03, 2003</a> *	
						<a href="#">Oct 17, 2002</a>	<a href="#">Jun 20, 2003</a>	
						<a href="#">Nov 23, 2002</a> *	<a href="#">Jun 23, 2003</a>	
						<a href="#">Nov 25, 2002</a> *	<a href="#">Sep 23, 2003</a>	
						<a href="#">Nov 28, 2002</a>	<a href="#">Sep 23, 2003</a>	
							<a href="#">Oct 28, 2003</a>	
							<a href="#">Nov 18, 2003</a>	
							<a href="#">Nov 26, 2003</a>	
							<a href="#">Nov 30, 2003</a>	
							<a href="#">Dec 14, 2003</a>	
							<a href="#">Dec 19, 2003</a>	

[Home](#) | [Help](#)Copyright © 2001, Internet Archive | [Terms of Use](#) | [Privacy Policy](#)

**Paneltec** has the following structure:

- <http://web.archive.org/web/19981202092552/http://www.panelteccorp.com/>
- Image: <http://web.archive.org/web/19981202092552/http://www.panelteccorp.com/newbuttons.gif>
- Image: <http://web.archive.org/web/19981202092552/http://www.panelteccorp.com/PTmain.gif>

**Location:** <http://web.archive.org/web/19981202092552/http://www.panelteccorp.com/>

**File MIME Type:** text/html

**Source:** Currently in disk cache

**Local cache file:** M0QVL268

**Last Modified:** Friday, October 23, 1998 4:34:43 PM Local time

**Last Modified:** Friday, October 23, 1998 8:34:43 PM GMT

**Content Length:** 4570

**Expires:** No date given

**Charset:** Unknown

**Security:** This is an insecure document that is not encrypted and offers no security protection.

http://web.archive.org/web/\*http://www.panelteccorp.com

# INTERNET ARCHIVE

## WayBackMachine

Enter Web Address: 

All

Adv. Search

Searched for <http://www.panelteccorp.com>

71 Results

Note some duplicates are not shown. [See all.](#)

\* denotes when site was updated.

### Search Results for: Jan 01, 1996 - Dec 13, 2004

1996	1997	1998	1999	2000	2001	2002	2003	2004
0 pages	0 pages	2 pages	3 pages	5 pages	12 pages	13 pages	25 pages	3 pages
		Dec 02, 1998 *	Jan 25, 1999	Feb 29, 2000 *	Feb 02, 2001	Jan 19, 2002	Feb 04, 2003	Jan 23, 2004
		Dec 12, 1998	Feb 18, 1999	May 20, 2000 *	Feb 05, 2001	Feb 07, 2002	Feb 14, 2003	Jan 26, 2004
			Feb 20, 1999	Jun 21, 2000	Mar 01, 2001	May 25, 2002	Feb 20, 2003	Feb 08, 2004
				Oct 22, 2000	Apr 01, 2001	May 29, 2002	Apr 02, 2003	
				Dec 06, 2000	Apr 05, 2001	Jun 01, 2002	Apr 12, 2003	
					May 17, 2001	Jun 03, 2002	Apr 22, 2003	
					Jun 02, 2001	Aug 02, 2002	Apr 29, 2003	
					Jul 21, 2001 *	Sep 25, 2002	Apr 26, 2003	
					Aug 05, 2001	Sep 28, 2002	May 01, 2003	
					Oct 01, 2001	Sep 29, 2002	May 31, 2003	
					Oct 18, 2001	Oct 11, 2002	Jun 05, 2003	
					Nov 27, 2001	Nov 21, 2002 *	Jun 06, 2003	
						Nov 29, 2002	Jun 18, 2003	
						Dec 08, 2002	Jul 21, 2003	
							Jul 26, 2003	
							Aug 05, 2003	
							Aug 09, 2003	
							Sep 24, 2003	
							Sep 25, 2003	
							Oct 10, 2003	
							Oct 26, 2003	
							Oct 27, 2003	
							Nov 25, 2003	
							Nov 30, 2003	
							Dec 01, 2003	
							Dec 07, 2003	
							Dec 09, 2003	
							Dec 12, 2003	

[Home](#) | [Help](#)Copyright © 2001, [Internet Archive](#) | [Terms of Use](#) | [Privacy Policy](#)

II. Abstract, Aitken et al., *The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body*, *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, Virginia Tech, June 27-30, 1999.

---

# **SYMPOSIUM ON RECENT DEVELOPMENTS IN THE STUDY OF IMPACTS ON COMPOSITE MATERIALS**

in conjunction with the **ASME 1999 Mechanics and Materials Conference**

Virginia Polytechnic Institute and State University, Blacksburg, VA

**June 27-30, 1999**

---

## **The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body**

**Aitken R.R., Horrigan D.P.W., Moltschaniwskyj G.,**

Department of Mechanical Engineering  
The University of Auckland  
Private Bag 92109, Auckland  
New Zealand.

---

Due to their high stiffness and strength ratios, composite sandwiches have been used increasingly in aerospace applications. The main drawback of these sandwich components is their relatively low resistance to impact damage and the amount by which their strength is reduced under compressive loading after such impact damage. To examine the impact damage formation of the composite sandwich, a series of high velocity impacts (greater than 100 kph) have been performed on Nomex honeycomb cored sandwich utilizing a thin (0.5 mm) glass fiber/epoxy facesheet. These impact specimens are representative of a flap trailing edge wedge component common on today's commercial aircraft. The impacts were performed with a pneumatic device launching a soft projectile 100-mm in diameter. The damage formed from this large contact area type event was seen to be large in plan area but shallow manifesting itself primarily as crushing of the sandwich core. The paper details the formation of the soft body Barely Visible Impact Damage (BVID) for impact velocities between the impact damage threshold and the limit value at which skin degradation occurs. Effects of impact incidence angle and impactor stiffness have also been reviewed. In addition to the experimental tests, a suitable finite element based predictive model to account for compressive impact failure of Nomex type honeycomb has been developed. The model is useful for predicting large plan area BVID honeycomb core crushing and relies on incorporation of a user defined honeycomb failure model. Both variations in the tensile versus compressive response and the stiffness degradation for non-metallic honeycomb in a crushed state are accounted for in the material model. Results from the finite element model have been compared to experimental data and show a good correlation for both hard and soft body impacts.

---



III. American Bowling Congress rules governing bowling lane specifications submitted  
with Applicants' response dated November 18, 2003

# INDEX

<b>I. Lane Specifications</b>	<b>PAGE</b>
<b>A. Regulation Bowling Lane</b> .....	3
1. Synthetic Products.....	3
2. Approach.....	3
3. Foul Line.....	3
4. Composition.....	4
5. Length.....	4
6. Width.....	4
7. Surface.....	4
<b>B. Lane &amp; Approach Marketings or Designs</b> .....	4
<b>C. Synthetic Bowling Lanes</b> .....	5
1. Identification.....	5
2. Gaps & Drop Off.....	5
<b>II. Pit Area Specifications</b>	
<b>A. Pin Deck</b> .....	6
1. Composition.....	6
2. Edgeboards.....	6
3. Synthetic Edge Strip.....	6
4. Pin Spots.....	6
5. Synthetic Pin Decks.....	6
6. Tail Plank.....	7
<b>B. Other Pit Area Specifications</b>	
1. Round Gutters.....	8
2. Flat Gutters.....	8
3. Reinforced Flat Gutters.....	8
4. Flat Gutter Molding.....	8
5. Reinforced Flat Gutter Molding.....	9
6. Kickbacks.....	9
7. Kickback Plates.....	9
8. Rear Cushion.....	9
9. Pit.....	9
<b>III. Bowling Ball Specifications</b>	
<b>A. General Bowling Ball Specifications</b>	
1. Material.....	13
2. Surface.....	13
3. Weight.....	13
4. Hardness.....	13
5. Devices.....	13
6. Mechanical Aids.....	13
7. Plugs and Designs/Logos.....	13
8. Cleaning.....	13
<b>B. Ball Manufacturing Specifications</b> .....	14
1. Physical Specifications.....	14
a. Circumference and diameter.....	14
b. Roundness.....	14
c. Hardness.....	14
d. Radius of Gyration.....	14
e. Coefficient of Restitution.....	14
f. Coefficient of Friction.....	14
g. Approval Logo.....	14
h. Markings.....	14
<b>C. Drilling Specifications</b>	
1. Holes.....	15
2. Balance.....	15
3. Plugs & Design.....	15
<b>IV. Lane Dressings &amp; Lane Dressing Measuring Equipment</b>	
<b>A. Technical Specifications for Lane Dressing</b> .....	16
<b>B. Technical Specifications for Lane Dressing Tape Take Up Device</b> .....	16
<b>C. Technical Specifications for Ultra Violet Sensitive Tape Reader</b> .....	17
<b>D. Technical Specifications for Lane Dressing Pick Up Tape</b> .....	18
<b>V. Bowling Pin Specifications</b>	
<b>A. General Tenpin Specifications</b>	
1. Material.....	19
2. Type of Construction.....	19
3. Adhesives.....	19
4. Weight.....	19
5. Center of Gravity.....	19
6. Radius of Gyration.....	19



7. Moisture Content .....	20
8. Finish .....	20
9. Coefficient of Restitution .....	20
10. Hardness .....	20
11. Design & Measurements .....	20
12. Pin Dimensions .....	21
13. Bases .....	23
14. Base Attachments .....	24
15. Label & Markings .....	24
16. Procedure for Approval .....	26
17. Renewal of Permit .....	26
18. Maintenance .....	26
19. Supplementary Finish .....	26
20. Patching Plastic Coated Pins .....	26
21. Head Patching Plastic Coated Pins .....	26
<b>B. Plastic Coated Tenpins</b> .....	<b>27</b>
1. Scope .....	27
2. Color .....	27
3. Quality of Maple .....	27
4. Thickness .....	27
5. Bases .....	27
6. Bond & Finish .....	27
7. Durability .....	27
8. Scoreability .....	27
<b>C. Synthetic Tenpins</b> .....	<b>28</b>
1. Approval .....	28
2. Color .....	28
3. Material .....	28
4. Weight .....	28
5. Core Filling .....	28
6. Exterior Coating .....	28
7. Balance .....	28
8. Measurement .....	28
9. Base Attachment .....	28
10. Center of Gravity .....	28
11. Radius of Gyration .....	28
12. Scoreability .....	28
13. Durability .....	28
14. Labeling .....	28
<b>D. Controlled Weight Pins</b> .....	<b>29</b>
<b>E. Plastic Base Attachments</b> .....	<b>29</b>
<b>F. Densified Tenpin Specifications</b> .....	<b>29</b>
<b>G. Synthetic Fibre Reinforced Coating Specifications</b> .....	<b>30</b>
<b>H. Refurbished Tenpin Specifications</b> .....	<b>30</b>
1. Renewal of Permit .....	30
<b>VI. Automatic Devices</b> .....	<b>31</b>
A. Automatic Pinsetting Device .....	31
B. Automatic Scoring Device .....	33
C. Automatic Foul Detecting Device .....	33
<b>VII. Test Procedures &amp; Scoring Criteria</b> .....	<b>34</b>
A. Manufacturer's Field Test Program for Products .....	34
B. Manufacturer's Field Test Program for Pins .....	34
C. Procedures for Bowling Ball Approval .....	34
D. Procedures for Product Test .....	36
E. Procedures for Pin Test .....	36
F. Scoring Level for Approval .....	38
G. Pin and Product Testing Timeframe .....	38
<b>VIII. Appendixes</b> .....	<b>39</b>
A. Testing for Moment of Inertia and Radius of Gyration of Bowling Balls .....	39
B. Issuance of Certificate .....	41
C. Resurfacing Requirements .....	41
D. Method of Test for Moment of Inertia and Radius of Gyration of Bowling ball .....	42
E. Method of Test for Coefficient of Restitution .....	45
F. Method of Test for Coefficient of Friction of Bowling Balls .....	47
G. Method of Test for Coefficient of Friction of Lane Surfaces .....	48
<b>IX. Glossary</b> .....	<b>49</b>

# REGULATION BOWLING LANE

A regulation bowling lane, including flat gutters, kickbacks and approach, must be constructed of wood and/or other materials which have been tested according to ABC/WIBC procedures for the specified time period and approved.

## Synthetic Products:

All non-wood material used in the manufacturing of lane components must be presented to ABC/WIBC for evaluation and possible testing before use in sanctioned competition. If approved, they may not be altered by the use of coatings, etc. unless these coatings have been presented to ABC/WIBC for evaluation and possible testing. In addition, all products must contain an approval label with the following requirements:

1. The label must be permanent, lasting the life of the product.
2. The label must be clearly visible after the product is installed in the bowling center.
3. The label must identify the company as the manufacturer.
4. The label must contain an approval number assigned by ABC/WIBC and state "ABC/WIBC Approved."

## Approach:

Extending from and exclusive of the foul line there shall be an unobstructed level approach which shall be:

1. Not less than 15 feet in length
2. Free from depressions exceeding 1/4 inch.
3. Not less than the width of the lane.

## Foul Line:

The foul line shall be:

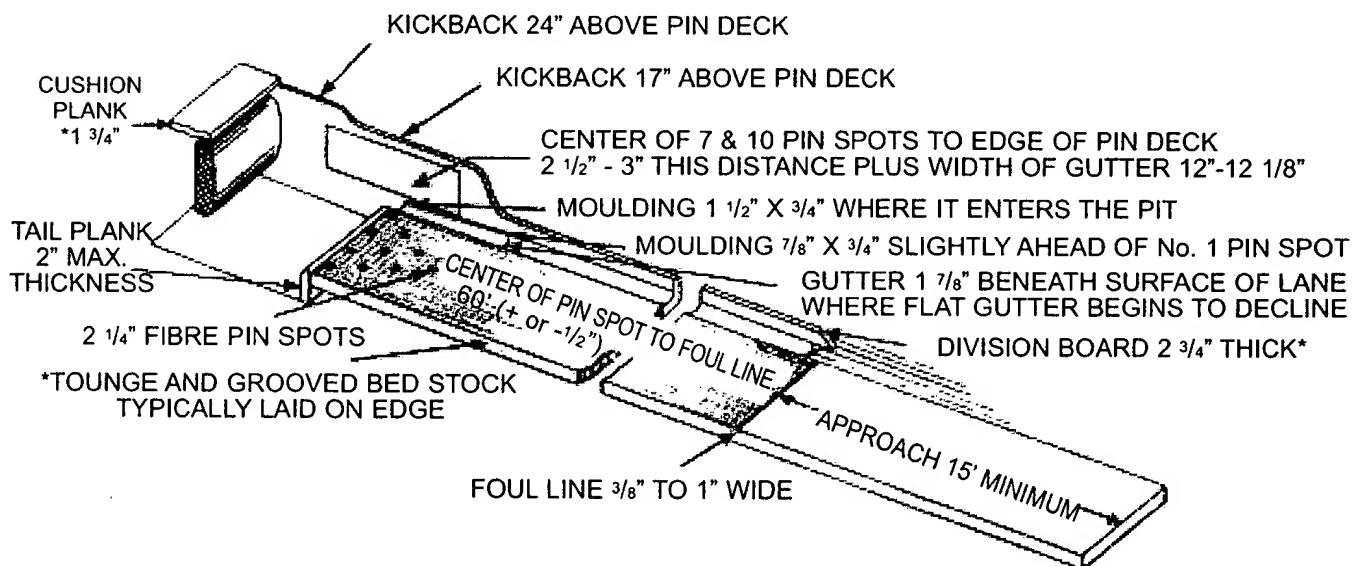
1. Not less than 3/8 inch nor more than 1 inch in width.
2. At a minimum, the entire width of the lane.
3. Distinctly marked upon or embedded between the lane and approach.

It may be required that the foul line be plainly marked on the walls, posts, division boards or any point on a line with the regular foul line.

(For more information on the foul line see the section on Automatic Foul Detecting Device.)

## ABC/WIBC Regulation Bowling Lane Dimensions

Typical Cross Section of Bowling Lane—Round Gutters from foul line to pin deck area.



\*NOTE: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes.

## Composition:

The lane must be constructed entirely of wood and/or synthetic materials which have been approved by ABC/WIBC.

## Length:

1. The overall length of a regulation lane, including the pin deck, has a reference dimension of 62 feet, 10 <sup>3</sup>/<sub>16</sub> inches, measured from the lane side of the foul line to the rear edge of the pin deck (not including the tail plank).
2. It must be 60 feet, plus/minus <sup>1</sup>/<sub>2</sub> inch, from the lane side of the foul line to the center of the No. 1 pin spot.
3. It must be 34 <sup>3</sup>/<sub>16</sub> inches, plus/minus <sup>1</sup>/<sub>16</sub> inch, from the center of the No. 1 pin spot to the rear edge of the pin deck (not including the tail plank).

## Width:

The lane shall be 41 <sup>1</sup>/<sub>2</sub> inches, plus/minus <sup>1</sup>/<sub>2</sub> inch, wide.

## Surface:

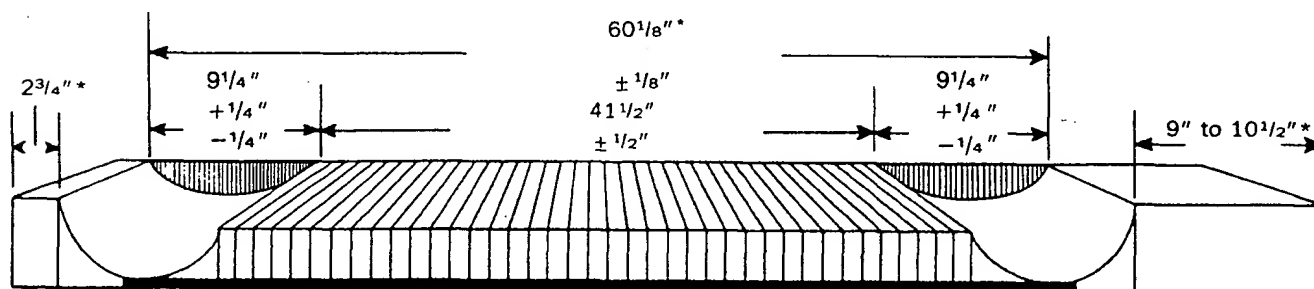
1. The surface must be free of all continuous grooves or ridges.
2. There shall be no depressions or crown in excess of <sup>40</sup>/<sub>1000</sub> inch on the surface of the lane over a 42 inch span.
3. There shall be no crosswise tilt in excess of the <sup>40</sup>/<sub>1000</sub> inch over the width of the lane.
4. The same lane finish coating shall be applied from the edgeboard to edgeboard.
5. The Coefficient of Friction of all lane surfaces shall not exceed .29 when measured with an ABC/WIBC approved device.

All bowling lane finish coatings as well as all synthetic lane surfaces must be submitted to ABC/WIBC for coefficient of friction testing before use in sanctioned competition.

In addition, all lane surface coatings must bear labels stating "This product complies with ABC/WIBC specifications when applied as directed by the manufacturer."

## ABC/WIBC Regulation Bowling Lane Dimensions

Typical Cross Section of Bowling Lane — Round Gutters from foul line to pin deck area.



\*NOTE: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes.

## Lane and Approach Markings or Designs

Markings or designs on the lanes and approaches shall be permitted in accordance with the following specifications:

1. Measured from the foul line, a maximum of seven (7) guides may be embedded in or stamped on the approach at each of the following points: 2-6 inches; 9-10 feet; 11-12 feet, and 14-15 feet. Each series of guides shall be parallel to the foul line and each guide shall be circular in shape, and shall not exceed <sup>3</sup>/<sub>4</sub> inch in diameter.
2. At a point 6-8 feet beyond the foul line and parallel thereto, there may be embedded in or stamped on the lane a maximum of ten (10) guides. Each guide shall be uniform, circular in shape, and shall not exceed <sup>3</sup>/<sub>4</sub> inch in diameter.
3. At a point 12-16 feet beyond the foul line, there may be embedded in or stamped on the lane a maximum of seven targets. Each of the targets shall be uni-

form and may consist of one or more dowels, darts, diamond, triangles or rectangular designs. The overall surface covered by each target shall not be more than 1 <sup>1</sup>/<sub>4</sub> inches in width and 6 inches in length. Each target must be equidistant from one another and set in a uniform pattern.

4. At a point 33-44 feet beyond the foul line, there may be a maximum of four targets. Each target must be uniform in appearance and shall not be wider than a single board nor longer than 36 inches.
5. Embedded markings or designs shall be of wood, fibre or plastic, and shall be flush and level with the surface of the lanes and approaches.
6. When the markings are stamped on wood lanes, they shall be applied to the bare wood and then covered with lacquer, urethane, or similar liquid transparent material generally used in resurfacing. All such installations in any one center shall be uniform as to design and measurement and at least on natural pairs of lanes.

# SYNTHETIC BOWLING LANE

All synthetic bowling lanes must be ABC/WIBC approved and meet all specifications for regulation bowling lanes in addition to the following:

## Identification:

On synthetic lane surfaces, each panel must have at least one label that meets the following requirements:

1. The label, identifying the manufacturer, must be permanent, lasting the life of the product, and clearly visible after it is installed.
2. The label must contain an approval number assigned by ABC/WIBC and state "ABC/WIBC Approved."
3. Overlay and complete systems with the same top surface must have the same approval number.
4. The color of the label can be similar to the colors used in the pattern, as long as they are visible upon close inspection.

## Gaps and Drop Off:

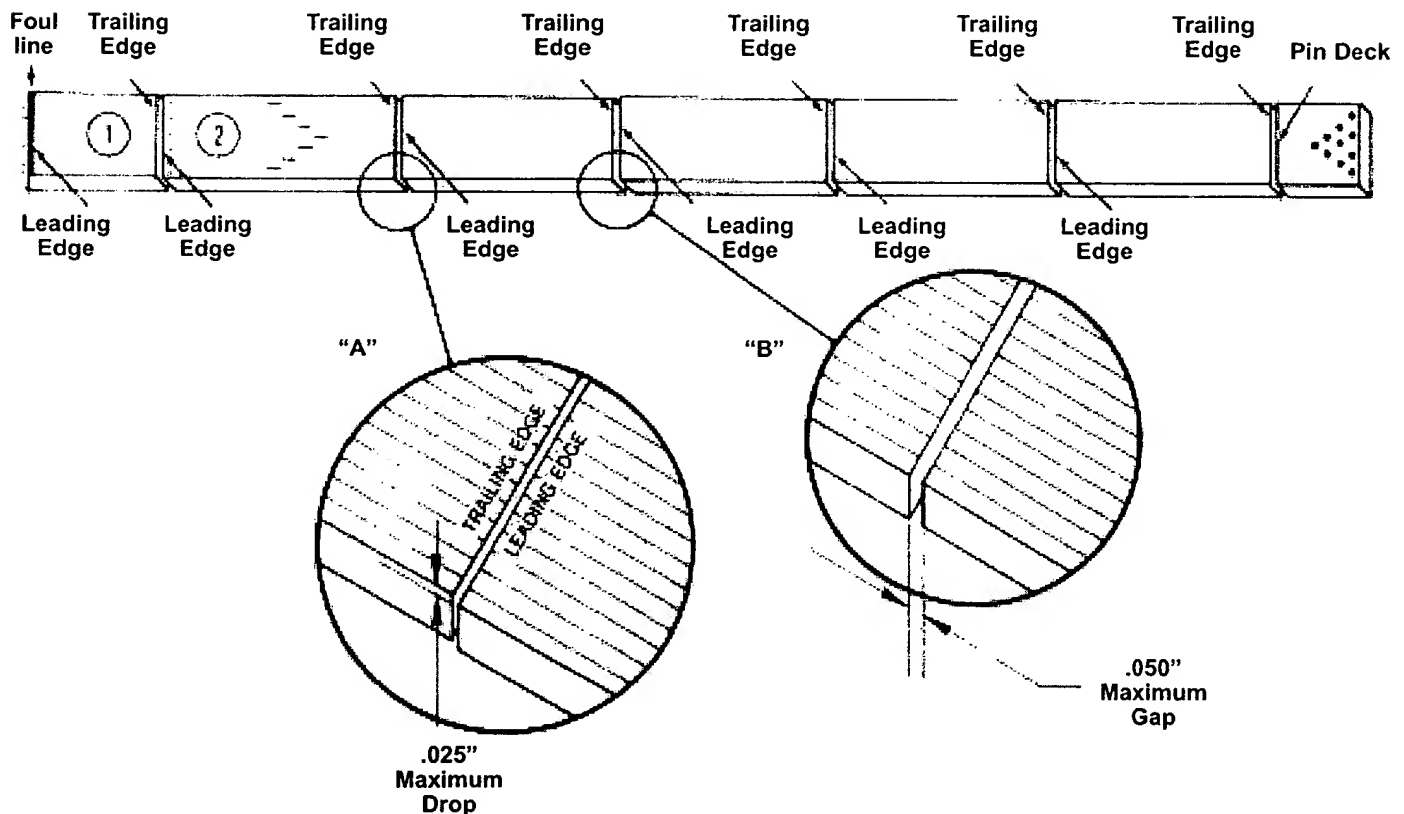
On synthetic lane surfaces, either panelized or overlay, where two panels meet, the following specifications must be met:

1. The leading edge of one panel shall be flush with, or not more than  $\frac{25}{1000}$  inch below the trailing edge of the adjoining panel at any point across the width of the lane.
2. The leading edge of the first panel shall be flush with, or not more than  $\frac{80}{1000}$  inch below the trailing edge of the foul line at any point across the width of the lane.
3. The gap between the leading and trailing edge of adjoining panels, across the width of the lane, shall not exceed  $\frac{50}{1000}$  inch at the time of installation.

(See the following diagram for description of "leading" and "trailing" edges.)

## Surface:

The surface of a synthetic lane may not be altered (coated) with any material unless first tested and approved.



## PIN DECK AREA

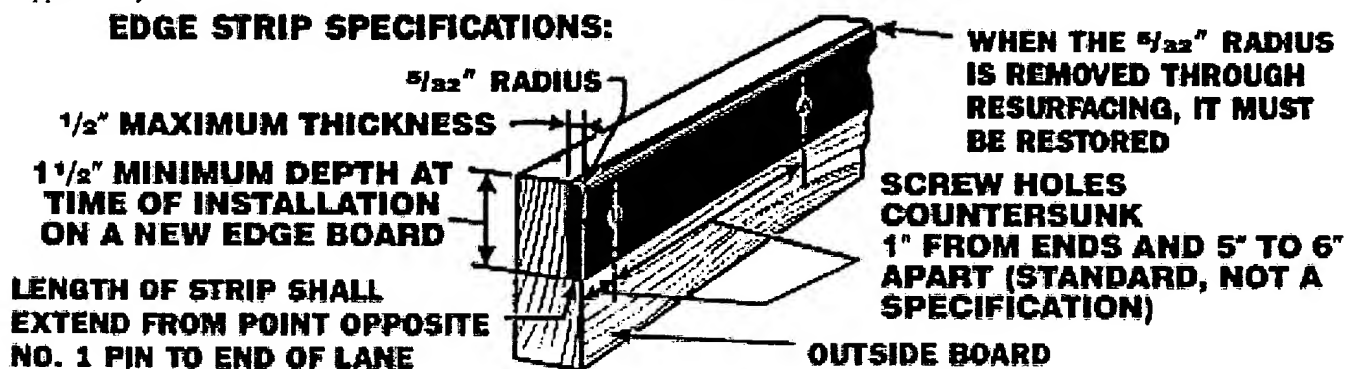
### Composition:

The pin deck may be constructed entirely of hardwood. Synthetic materials, alone or in combination with other materials, may be used provided these materials have been tested and approved by ABC/WIBC.

### Edgeboards:

The edgeboards must be rounded on a radius of not more than  $\frac{5}{32}$  inch. If the radius is removed, such radius must be restored. The edgeboard may be constructed entirely of hardwood without testing. Synthetic materials, alone or in combination with other materials, may be used provided these materials have been tested and approved by ABC/WIBC.

### EDGE STRIP SPECIFICATIONS:



### Synthetic Pin Decks:

If the pin deck surface includes the tail plank, the end of the lane must be visibly identified with a minimum mark of at least 2 inches in length on the 10 pin side of the pin deck for the life of the pin deck.

If nonwood pin decks are in use with either wood or non wood lane surfaces, the leading edge of the pin deck must be flush with to not more than  $^{25}/_{1000}$  inch below the trailing edge of the adjoining lane section across the width of the lane.

The gap between the pin deck and the adjoining lane section, across the width of the lane, shall not exceed  $\frac{50}{1000}$  inch.

### Pin Spots:

All pin spots, upon which the pins must be set, shall be clearly identified for the life of the pin deck and be 2 1/4 inches in diameter, plus/minus 1/16 inch, and meet the following location specifications:

1. Spaced 12 inches plus/minus  $\frac{1}{16}$  inch, (non accumulative) in an equilateral triangular.
2. 3 inches, plus/minus  $\frac{1}{16}$  inch, from the center of 7, 8, 9 and 10 pin spots to the pit (not including the tail plank).
3. 2  $\frac{3}{4}$  inches, plus/minus  $\frac{1}{4}$  inch, from the center of the 7 and 10 pin spots to the adjacent side of the pin deck.

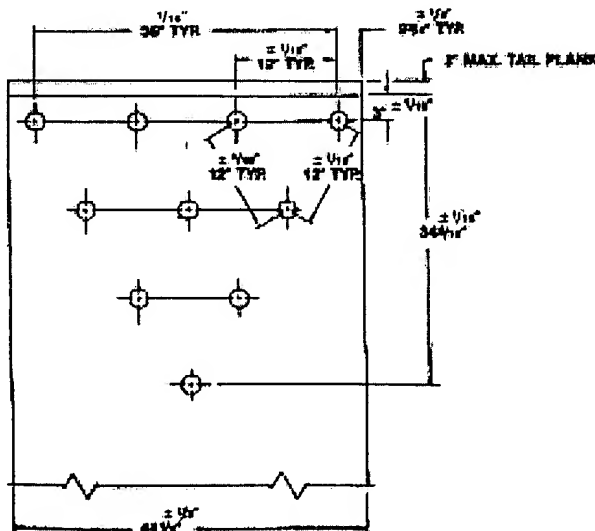
### Synthetic Edge Strip:

A synthetic edge strip, measuring not more than 1/2 inch in thickness and:

1. not less than 1 1/2 inches in depth, at time of installation on a new edgeboard
2. not less than 1 inch in depth, at time of installation on an existing edgeboard

May be attached to the side of the pin deck nearest the gutters and at a minimum, shall extend from a point opposite the No. 1 pin to the pit. It must be installed vertically so the synthetic material exposed on the pin deck surface is not in excess of 1/2 inch.

4. 12  $\frac{1}{16}$  inches, plus/minus  $\frac{1}{16}$  inch, from the center of the 7 and 10 pin spots to the nearest kickback.
5. The No. 1 pin spot shall be equidistant from both edges of the lane and both kickbacks with a tolerance of plus/minus  $\frac{1}{8}$  inch, and never less than 30 inches from its center to the kickbacks.
6. 31  $\frac{3}{16}$  inches, (reference dimension) from center of the No. 1 pin spot to a perpendicular line drawn through the centers of the back row of spots.
7. 34  $\frac{3}{16}$  inches from the center of the No. 1 pin spot, to the pit (not including the tail plank).



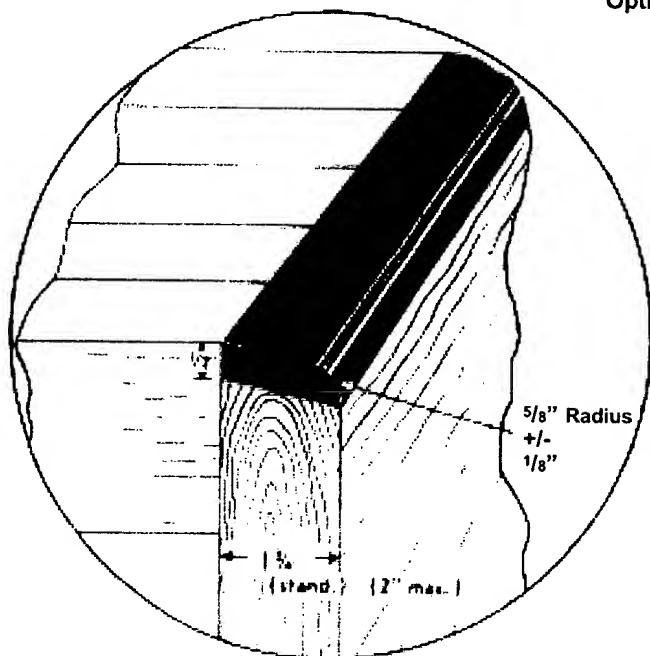
## Tail Plank:

A tail plank, not to exceed 2 inches in thickness, may be attached to the rear of the lane. The tail plank may be constructed entirely of hardwood without testing but synthetic materials, alone or in combination with other materials, must be evaluated by ABC/WIBC before use.

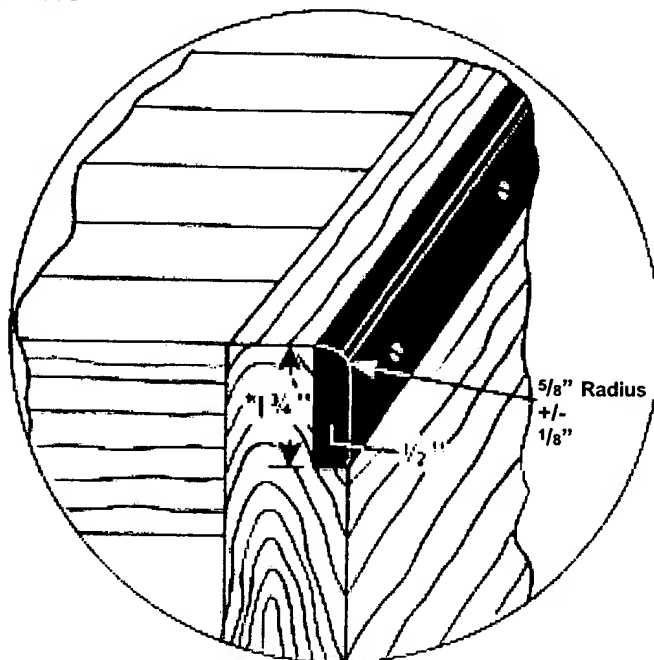
The exposed edge of the tail plank may be covered with a piece of synthetic material which must have a radius of  $\frac{5}{8}$  inch, plus/minus  $\frac{1}{8}$  inch at the intersection of the top edge and rear face of the tail plank. At no time may there be more than 5 inches of flat playing surface including the tail plank in back of the centers of the 7, 8, 9, and 10 pin spots.

## REINFORCED TAIL PLANK

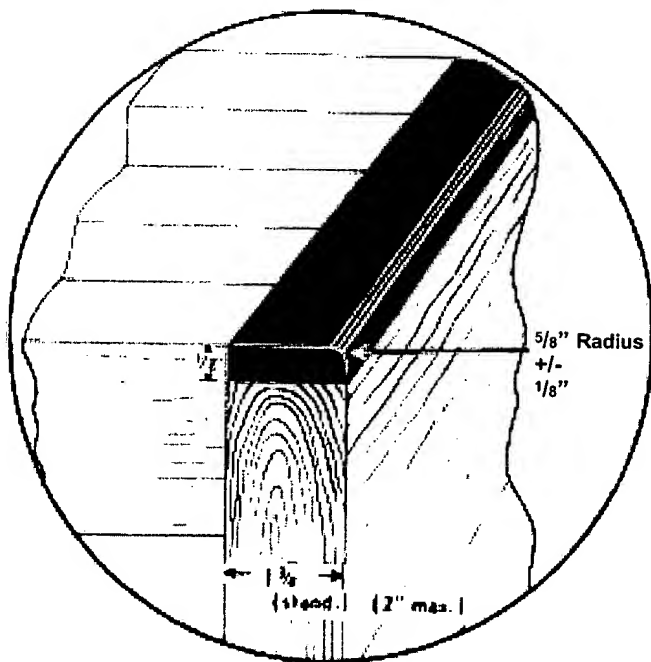
### Optional Methods



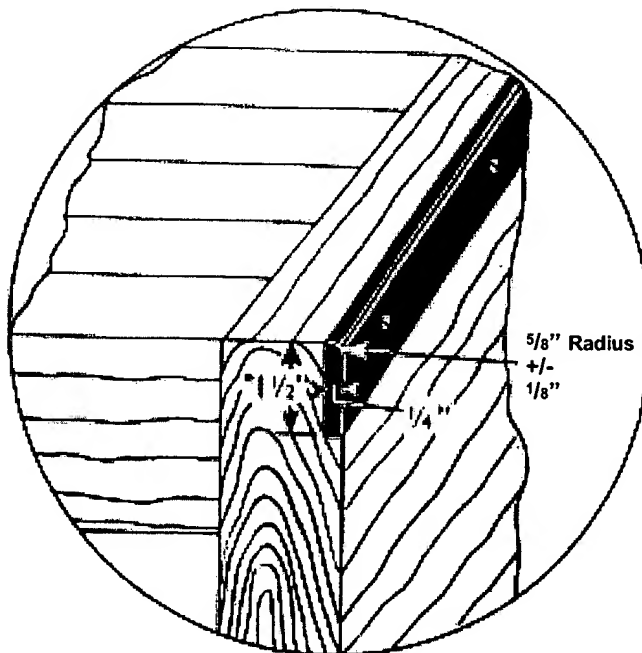
Fibre or Phenolic Applied  
on Slanting Joint



Fibre or Phenolic Applied  
on Right Angle Joint



Fibre or Phenolic Applied  
on Exposed Edge



Fibre or Phenolic Applied  
on Exposed Edge

# GUTTERS

Gutters shall be placed on each side of the lane and shall begin at the foul line and extend parallel with the lane to the pit.

## Round Gutters:

1. The width, shall be 9 1/4 inch, plus/minus 1/4 inch.
2. They must be concave in shape.
3. They must measure at least 1 7/8 inch in depth at center at time of manufacture.

## Flat Gutters:

Flat gutters, must be constructed of wood or other materials which have been tested according to ABC/WIBC procedures for the specified time period and approved.

1. The width shall be 9 1/4 inches, plus/minus 1/4 inch, including the molding.
2. From a point opposite or within 15 inches ahead of the No. 1 pin spot, the gutter must have square bottoms and must be at least 1 7/8 inch beneath the surface of the lane.
3. Opposite the center of the rear row of pin spots the depth shall be 3 1/2 inches, plus/minus 1/8 inch.

## Reinforced Flat Gutters:

1. The dimensions shall be the same as flat gutters.
2. The reinforcing material may cover the entire length and width of the bottom, or be 4 inches, plus/minus 1/2 inch, in width and cover the total length.
3. If vulcanized fibre reinforcing is used, it shall not exceed 3/16 inch in thickness.
4. If laminated phenolic reinforcing, Grade "C" or "CE", is used, it shall not exceed 1/8 inch in thickness.

## Flat Gutter Molding: (Solid Hardwood)

A strip of molding extending the entire length of the flat gutter shall be securely fastened to the bottom of the flat gutter. The molding may be constructed entirely of hardwood without testing. Synthetic materials, alone or in combination with other materials, which have been approved by ABC/WIBC after testing may be used.

1. They may not exceed 7/8 inch high, at the leading edge, gradually increasing to a maximum of 1 1/2 inches high opposite the 7 and 10 pin spots. (Measured from the top surface of the flat gutter to the top of the molding.)
2. They may not exceed 3/4 inch in width.
3. The top exposed edge shall be rounded to a radius of 5/8 inch, plus/minus 1/8 inch.

## Reinforced gutter optional methods

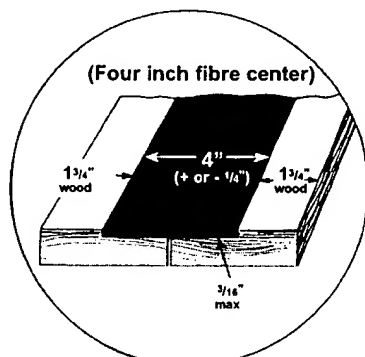


Figure A

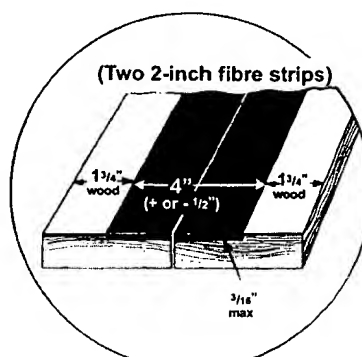


Figure B

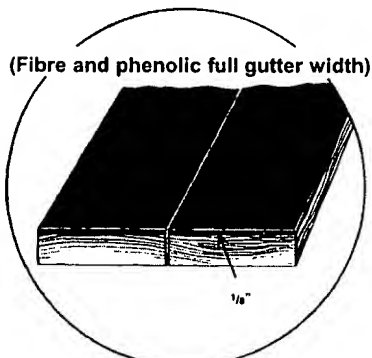


Figure C

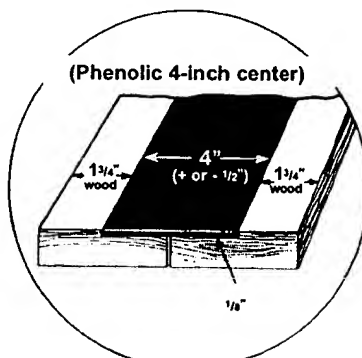


Figure D

### Reinforced Flat Gutter Molding:

1. They must meet all physical dimensions of solid hardwood flat gutter molding.
2. The wearing surface may be reinforced from the pit to at least the point opposite the No. 1 pin spot.
3. If vulcanized fibre is used, it may not exceed  $\frac{1}{4}$  inch when used on the side or  $\frac{1}{2}$  inch thick when used on the top. (See drawing)
4. If laminated phenolic material Grade "C" or "CE" is used, it shall be  $\frac{1}{8}$  inch thick.

### Kickbacks:

The kickback may be constructed entirely of hardwood without testing. Synthetic materials, alone or in combination with other materials which have been approved ABC/WIBC after testing may be used. The kickbacks, or side partitions, shall be placed parallel to the lane and shall meet the following requirements:

1. It shall extend from a point opposite or within 15 inches ahead of the No. 1 pin spot to the rear cushion wall.
2. The distance between the wood faces of the two kickbacks shall be  $60 \frac{1}{8}$  inches, plus/minus  $\frac{1}{8}$  inch.
3. The height above the lane shall be  $20 \frac{1}{2}$  inches, plus/minus  $3 \frac{1}{2}$  inches.

The kickbacks, behind the tail plank, may be covered with impregnated fibre glass, hard vulcanized fibre, or laminated phenolic (Grade "C" or "CE").

### Kickback Plates:

The kickbacks may be covered with a single layer of reinforcing material, not to exceed  $\frac{3}{16}$  inch in thickness. The following materials may be used:

1. Hard vulcanized fibre.
2. Laminated phenolic (Grade "C" or "CE").
3. Rigid thermoplastic vinyl copolymer.

Other materials, may be used provided they have been tested and approved by ABC/WIBC.

### Rear Cushion:

The rear cushion shall in all cases be covered with material of a dark color and shall be so constructed as to prevent the pins from rebounding onto the lane. (For pit and rear cushion measurements on automatic pinsetting devices see section on Automatic Pinsetting devices in this manual.)

### Pit:

1. For lanes without automatic pinsetting devices, there shall not be less than 10 inches from the pit floor to the top of the lane and it shall not be less than  $9 \frac{1}{2}$  inches from the top of the pit mat to the top of the lane. The pit shall not be less than 30 inches in depth from the rear edge of the lane (including the width of the tail plank as a portion of the measurement) to the face of the rear cushion.
2. For lanes with automatic pinsetting devices, see the diagrams on page 12.

### Reinforced Gutter Molding Optional Methods

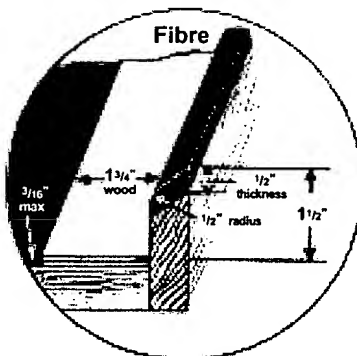


Figure A

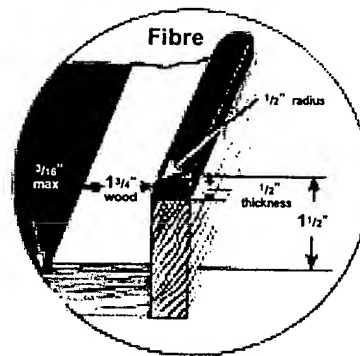


Figure B

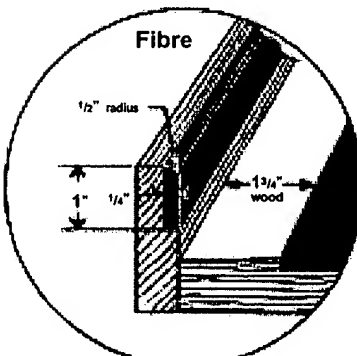


Figure C

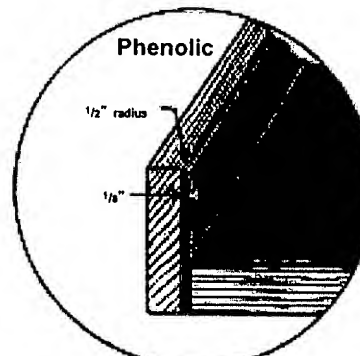
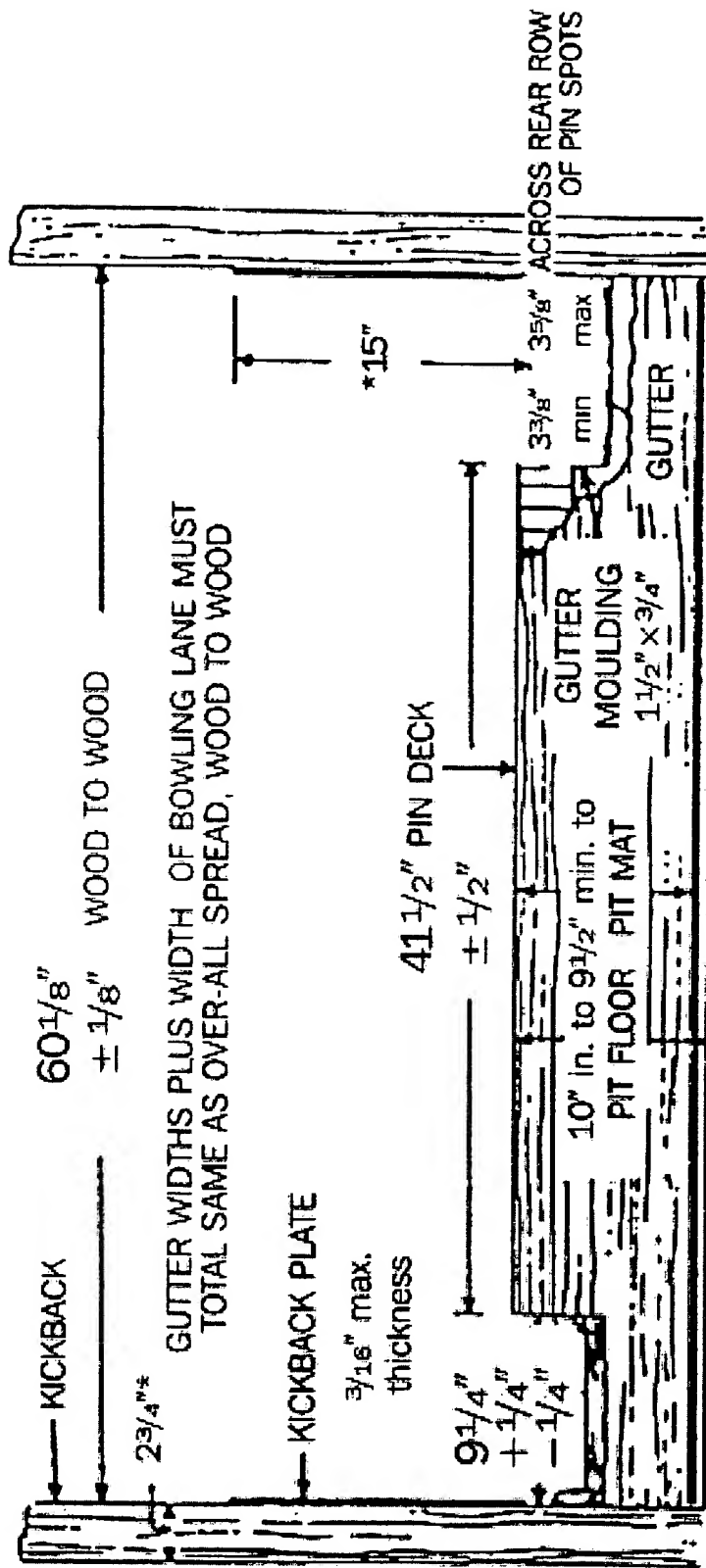


Figure D



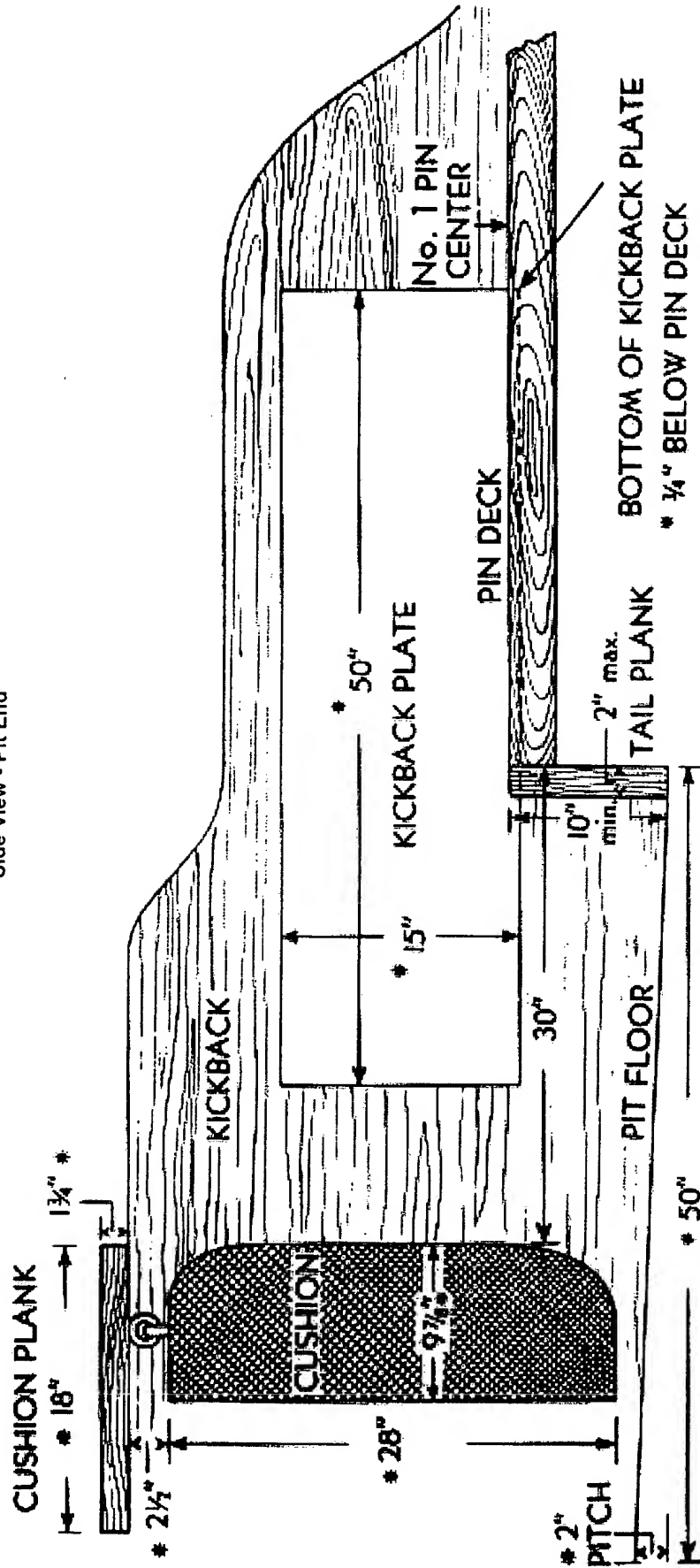
\*Note: These are not specifications but accepted standards  
For installing bowling lanes.

## REGULATION BOWLING LANE DIMENSIONS PIT END VIEW



# REGULATION BOWLING LANE DIMENSIONS

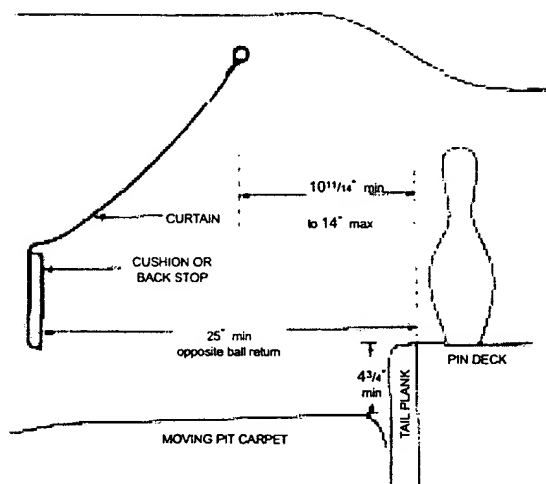
Side View - Pit End



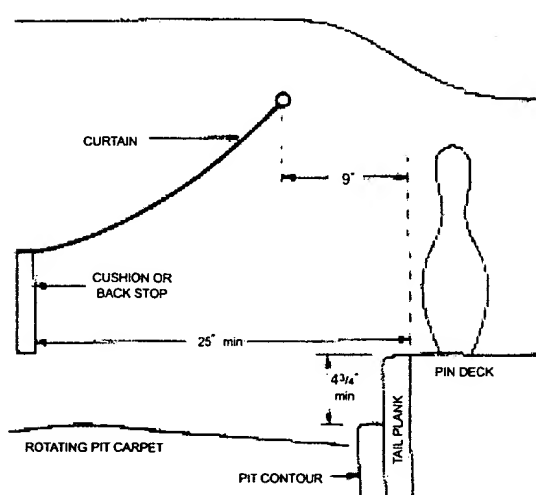
\*Note: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes

# PIT MEASUREMENTS — AUTOMATIC PINSETTING DEVICE

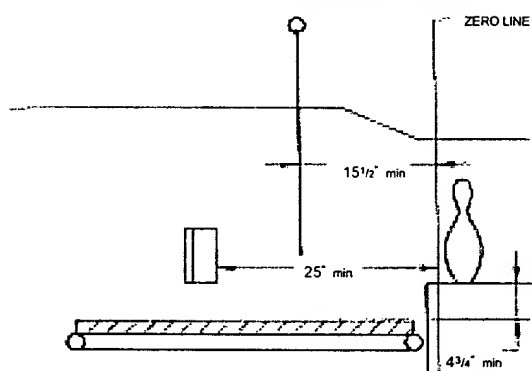
AMF/VANTAGE



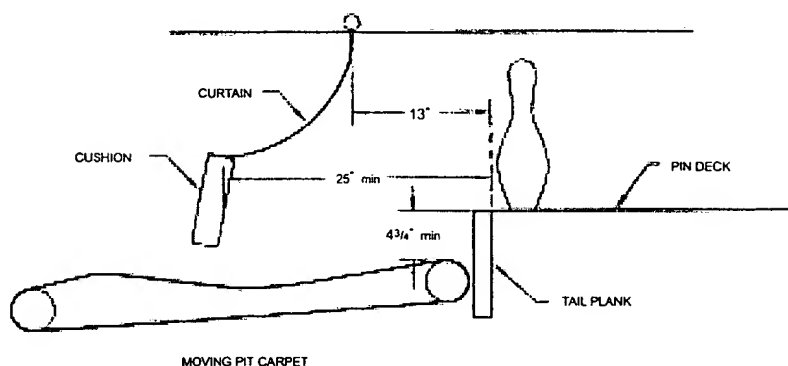
BOWL-MOR, and Z-3



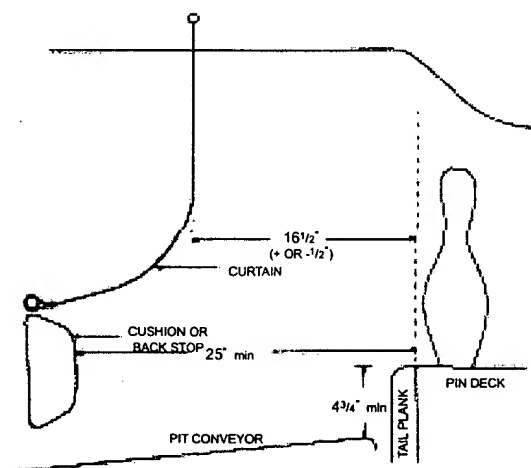
HEDDON H-300-R



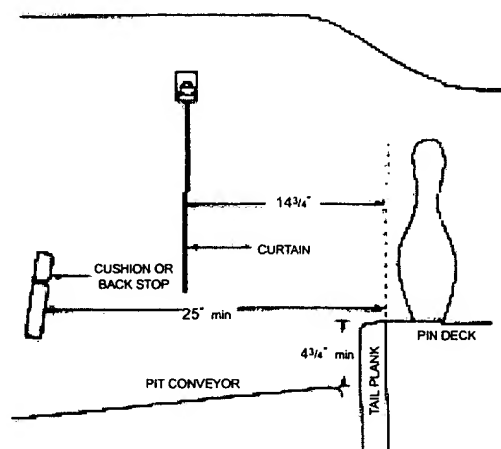
MEENDES MM-2001



BRUNSWICK, HEDDON H-4, DACOS



BRUNSWICK GS-10



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**